AG Contract No: KR03-0793-TRN
ADOT ECS File: JPA 03-068
Project No IM 040 D(007)A
TRACS No : H524601C
Interstate 40 – Concrete Testing

INTERAGENCY SERVICES AGREEMENT

FIXED-PRICE
NO. 03-1419

BETWEEN
THE ARIZONA DEPARTMENT OF TRANSPORTATION
AND
THE ARIZONA STATE UNIVERSITY

THIS AGREEMENT is made and entered into 18th August, 2003, by and between the Arizona Department of Transportation Holbrook Construction (hereinafter called "Sponsor"), and the Arizona Board of Regents for and on behalf of Arizona State University (hereinafter called "ASU")

RECITALS

WHEREAS the Sponsor is empowered by Arizona Revised Statutes Section 28-401 to enter into this agreement and has delegated to the undersigned the authority to execute this agreement on behalf of the Sponsor.

WHEREAS the ASU is empowered by Arizona Revised Statutes Section 15-1626 to enter into this agreement and has delegated to the undersigned authority to execute this agreement on behalf of the University.

WHEREAS Sponsor desires that ASU perform certain services as described in the scope of work attached hereto and incorporated herein as Exhibit A, and ASU desires to perform such services upon and subject to the terms and conditions hereinafter set forth.

NOW, THEREFORE, the parties agree as follows:

ARTICLE I SCOPE OF WORK. ASU shall use all reasonable efforts to perform the services and deliver any reports or other items specified in Exhibit A attached hereto.

ARTICLE II PROJECT DIRECTOR. ASU shall provide Dr Kamil Kaloush Department of Civil and Environmental Engineering, as Project Director for work under this Agreement. The Project Director shall not be replaced without prior consent of Sponsor.

ARTICLE III PERIOD OF PERFORMANCE. This Agreement shall begin on February 21, 2003 and shall terminate on June 30, 2004. This Agreement may be modified or extended at any time by mutual written consent of both parties.

NO. 26242
Filed with the Secretary of State
Date Filed: 08/18/03
Janice K. Brewer
Secretary of State
By: Diane D. Graenewald

ARTICLE IV SPECIAL PROVISIONS.

1. **Compensation.** Compensation shall be on a firm-fixed-price basis. Sponsor shall pay ASU a lump sum amount of $60,000.00, for ASU's services hereunder. Sponsor shall remit not less than fifty-percent (50%) ($30,000.00), of the total contract price upon execution by both parties of this Agreement. The remaining amount of the contract price ($30,000.00), due under this Agreement, shall be paid nor more than monthly, upon receipt of invoices. Invoices are due and payable within 30 days.

2. **Publications.** Sponsor recognizes that under ASU policy the results of work performed under this Agreement must be publishable and agrees that ASU and its employees and students engaged in work under this Agreement shall be free to present at symposia or professional meetings, and to publish in journals, theses or dissertations, or otherwise of their own choosing, methods and results of the work performed under this Agreement. Upon written request by Sponsor, copies of proposed manuscripts will be furnished to Sponsor for review prior to publication. In no event will ASU delay publication for more than thirty (30) days from date of submittal of manuscript for Sponsor review.

3. **Notices.** All notices under this Agreement given by either party to the other shall be in writing and shall be sent by U.S. Postal Service, first class, facsimile or e-mail. Addresses are as follows:

For ASU: Office for Research & Sponsored Projects Admin.

Arizona State University
P.O. Box 873503
Tempe, Arizona 85287-3503

Attn: Karina Lugo
e-mail: Karina Lugo@asu.edu
cc: Dr. Kamil Kaloush
Department of Civil and
Environmental Engineering

Phone: 480-965-0029 Fax: 480-965-8013

For Contracting
Arizona Department of Transportation
Joint Project Administration
205 S. 17th Avenue, Mail Drop 616E
Phoenix, AZ 85007
FAX: 602-712-7424

For Sponsor: Randy Routhier
ADOT Holbrook Construction
2407 E. Navajo Blvd., Suite D
Holbrook, AZ 86025
Phone: 928-524-6801 x233
Fax: 928-524-6405

4. **Confidentiality.** ASU shall not be responsible for the protection of confidential or proprietary information.

ARTICLE V. GENERAL PROVISIONS.

1. **Entire Agreement.** This Agreement embodies the entire understanding of the parties and supersedes any other agreement or understanding between the parties relating to the subject matter. The parties agree that should any part of this Agreement be held to be invalid or void, the remainder of the Agreement shall remain in full force and effect and shall be binding upon the parties.

2. **Waivers.** No waiver, amendment or modification of this Agreement shall be valid or binding unless written and signed by the parties. Waiver by either party of any breach or default of any clause of this Agreement by the other party shall not operate as a waiver of any previous or future default or breach of the same or different clause of this Agreement.

3. **Assignment.** Neither party may assign any rights hereunder without the express, written, prior consent of both parties.

4. **Governing Law.** This Agreement shall be governed by and construed in accordance with the laws of the State of Arizona.

5. **Cancellation for Non-appropriations.** The parties recognize that performance by ASU depends upon appropriation of funds by the State Legislature of Arizona. If the Legislature fails to appropriate the necessary funds, or if ASU's appropriation is reduced during the fiscal year, ASU may reduce the scope of this Agreement if appropriate or cancel this Agreement without further duty or obligation. ASU agrees to notify Sponsor as soon as reasonably possible after ASU knows of the loss of funds

6. **Conflict of Interest.** This Agreement is subject to the provisions of A.R.S. 38-511. The State of Arizona may cancel this Agreement if any person significantly involved in negotiating, drafting, securing or obtaining this Agreement for or on behalf of the Arizona Board of Regents becomes an employee in any capacity of any other party or a consultant to any other party with reference to the subject matter of this Agreement while the Agreement or any extension thereof is in effect.

7. **Independent Contractor.** ASU is an independent contractor and shall be free to exercise its discretion and independent judgment as to the method and means of performance of its work hereunder. ASU employees shall not be considered employees of Sponsor, and neither ASU nor Sponsor personnel will, by virtue of this Agreement, be entitled or eligible, by reason of this agreement, to participate in any benefits or privileges given or extended by the other party to its employees.

8. **Termination.** Either party may at any time terminate this Agreement by giving the other party not less than thirty (30) days prior written notice. In the event this Agreement is canceled by Sponsor, Sponsor shall remain responsible for payment to ASU for all work performed through the date of termination and for reimbursement to ASU of all non-cancelable commitments incurred in the conduct of the research. Non-cancelable commitments shall include employment commitments to ASU personnel through the end of the semester following any such termination by Sponsor. In the event ASU terminates this Agreement any unused funds from the advance will be returned.

9. **Arbitration.** In the event of any dispute, claim, question, or disagreement arising from or relating to this agreement or the breach thereof, the parties hereto shall use their best efforts to settle the dispute, claim, question, or disagreement. To this effect, they shall consult and negotiate with each other in good faith and, recognizing their mutual interests, attempt to reach a just and equitable solution satisfactory to both parties. If they do not reach such solution within a period of 60 days, then, upon notice by either party to the other, all disputes, claims, questions, or differences shall be finally settled by arbitration administered by the American Arbitration Association in accordance with the provisions of its Commercial Arbitration Rules.

10. **Insurance.** ASU maintains general liability insurance and worker's compensation coverage as required by state law and pertinent federal laws and regulations under the State of Arizona Risk Management Plan.

11. **Liability** It is understood that neither party to this agreement agrees to indemnify the other party or hold harmless the other party from liability hereunder.

12. **Nondiscrimination.** The parties agree to comply with all applicable state and federal laws, rules, regulations and executive orders governing equal employment opportunity, nondiscrimination and affirmative action.

13. **News Release.** Sponsor may not use the name of ASU in news releases, publicity, advertising, or other promotion, without the prior written consent of ASU, except for documents used for internal consumption by Sponsor.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by its duly authorized representatives on the respective dates entered below.

ARIZONA BOARD OF REGENTS,
FOR AND ON BEHALF OF
ARIZONA STATE UNIVERSITY

By: Cheryl L Cromer
for RANDALL W. DRAPER, PH.D., Director
Research Administration

Date: 7/30/03

DEPARTMENT OF TRANSPORTATION
Operations

By: Douglas A. Forstie
DOUGLAS A. FORSTIE, P.E.
Acting Deputy State Engineer,

Date: 8/6/03

PROJECT DIRECTOR APPROVAL
I have reviewed the terms of this contract and they are acceptable to me. I request that an authorized signatory execute this contract on behalf of the University.

By 7-25-03
Kamil Kaloush Date

Special Testing of I-40 Pavement Rehabilitation Asphalt Mixtures

Submitted to:

ADOT Holbrook Construction
2407 E. Navajo Blvd Suite D
Holbrook, AZ 86025

Submitted by:

Kamil E. Kaloush, Ph.D., P.E.
Assistant Professor

College of Engineering and Applied Sciences
Department of Civil and Environmental Engineering
Arizona State University
Tempe, AZ 85287-5306

April 3, 2003

Approval:

Principal Investigator	**ADOT Holbrook Construction**
Kamil E. Kaloush	**Randy Routhier**
4-3-03	6/10/03
Date	**Date**

Research Work Plan

Special Testing of I-40 Pavement Rehabilitation Asphalt Mixtures Two Guns – Dennision MP 229.5 – 240.00

Introduction

This project is a continuation of the on-going efforts between the Arizona Department of Transportation (ADOT), Arizona State University and the local industry to build a database of typical engineering properties of asphalt mixtures used in Arizona. One goal of this effort is to advance the engineering technology and implementation of Asphalt Rubber (AR) projects through well-defined research and special laboratory testing activities. These activities support paving processes that combine laboratory research and field performance to ascertain the quality of AR pavement construction.

Study Objectives

The objective of this study is to conduct a laboratory experimental program to obtain typical engineering material properties for two asphalt rubber mixtures and one conventional mixture used in the pavement rehabilitation of I-40, Two Guns – Dennision MP 229.5-240.00.

Scope of Work

All mixtures will be sampled during construction by FNF Construction, Inc. and in cooperation with ADOT. Approximately, 1500 lbs of each mix will be needed for the testing program as noted in Items 2, 3 and 4 of ADOT's Materials Design Report (March 20, 2002). As agreed upon during the Partnering Meeting on March 10, 2003, five 1-gallon samples of each binder (two virgin binders and two crumb rubber modified binders) used for the mixtures will be also collected by FNF. The mixes and binders will be transported to ASU laboratories. At ASU, the mixes will be re-heated and compacted using 6-inch diameter gyratory molds for triaxial specimens. Beam specimens will be compacted according to AASHTO TP8 test protocols. The target air void level for the test specimens will be similar to those achieved in the field. One 4-inch diameter samples will be cored from each gyratory plug. The sample ends will be sawed to arrive at typical test specimens of 4-inch in diameter and 6-inch in height. Thickness and bulk densities will be measured and the samples will be stored in plastic bags in preparation for the testing program outlined below.

Data obtained from these mixtures will be summarized in spreadsheets. The spreadsheet will contain information such as binder tests and information, aggregates, volumetric mix properties, and the results of the advanced dynamic material characterization tests. These tests include; triaxial shear strength, dynamic (complex) modulus, static creep and repeated load for permanent deformation characterization; indirect tensile creep test for thermal cracking characterization; and flexural beam tests for fatigue cracking evaluation.

The data can be also used to establish a relative ranking of the mixtures according to their expected rutting or cracking potential.

Binder Tests

ASU has been developing for ADOT an AC Binder Characterization Database to develop properties of typical AC binders that are commonly used in ADOT construction projects. The four binders evaluated in this research will be subjected to tests that will provide ASTM Ai-VTSi consistency-temperature relationships. These tests will be conducted for original conditions and will include: Penetration at 15 and 25°C, Ring and Ball Softening Point at 60°C, and Rotational Viscosities at selected temperature range.

Mixture Tests

Each mixture will be subjected to the following testing program:

Triaxial Shear Strength

The first test that will be conducted on each mix is the classical shear strength test. The test will be conducted unconfined and using two levels of confinements. The test will provide the standard cohesion and the angle of internal friction parameters, which describe the failure envelop of the mix. One temperature will be used: 100°F, using two replicates at each confinement level.

Dynamic (Complex) Modulus

Dynamic Complex) Moduli will be evaluated at a full factorial of 5 Temp levels (0, 40, 70, 100, and 130°F) and 6 frequencies (0.1, 0.5, 1, 5, 10 and 25 Hz). An electrohydraulic dynamic load system will be used to apply continuously sinusoidal loads at the temperature-frequency combinations noted. Analyses of the data will include computations of the parameters that include: phase angle and complex modulus for each mix. Master moduli curves will also be developed for each mixture. This testing will be conducted unconfined, but confined testing will be done for the open graded mixture. Three replicates will be utilized for each mix / test state condition.

Static Creep Tests

The third type of load response test that will be conducted on each mix will be the static creep / flow time test. Three replicates will be used for each stress level and temperature combinations. Creep tests will be conducted at 100°F, in an unconfined and confined state of stress. Compliance parameters as well as the flow time (tertiary failure) will be determined from each test.

Repeated Load Permanent Deformation Tests

The fourth material load response test to be conducted on each mixture will be the repeated load permanent deformation test. Similar to creep testing, permanent deformation tests will be conducted at 100°F, confined and unconfined state of stress. A haversine pulse load of 0.1 sec and 0.9 sec dwell (rest time) will be applied for a test duration of appropriately 3 hours (or until the test specimen fails). This will result in approximately 10,000 cycles. Permanent deformation and tertiary flow parameters will be obtained and analyzed for each test.

Indirect Tensile Creep Tests

The fifth type of load response test that will be conducted on each mix will be the indirect tensile static creep test. Three replicates will be used at one stress level and three temperatures: 32, 14, -4°F. Creep tests will be conducted for about 1000 seconds, and compliance parameters will be determined from each test.

Beam Fatigue Tests

The last type of load response test that will be conducted on each mix will be the fatigue cracking test. A constant strain test will be utilized. Three temperatures: 40, 70, and 100°F and a minimum of six strain levels will be used. Flexural parameters such as stiffness and dissipated energy will be will be determined from each test.

Final Report

Upon completion of all work activities, a written report detailing the results of the findings will be prepared and submitted. The project activities will be completed within 12 months from the time the mixes are received at ASU.

Study Cost

The cost to conduct the work detailed in this proposal as outlined in ADOT's Materials Design Report is a lump sum of $20,000 per mix for a total of $60.000.

JPA 03-068

APPROVAL ATTORNEY FORM FOR

THE ARIZONA STATE UNIVERSITY

I have reviewed the above referenced intergovernmental agreement between the DEPARTMENT OF TRANSPORTATION, INTERMODAL TRANSPORTATION DIVISION, and the ARIZONA STATE UNIVERSITY, an agreement among public agencies which, has been reviewed and declare this agreement to be in proper form and within the powers and authority granted to the ARIZONA STATE UNIVERSITY under the laws of the State of Arizona. No opinion is expressed as to the authority of the State to enter into this agreement.

DATED this 30 day of July, 2003.

TERRY GODDARD
ATTORNEY GENERAL

OFFICE OF THE ATTORNEY GENERAL
STATE OF ARIZONA

TRANSPORTATION SECTION
WRITER'S DIRECT NO: 602.542.8837

INTERGOVERNMENTAL AGREEMENT
DETERMINATION

A.G. Contract No. KR03-0793-TRN, an agreement between public agencies, has been reviewed pursuant to A.R.S. § 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining parties, other than the State or its agencies, to enter into said agreement.

Date: 11 August 2003

Terry Goddard
ATTORNEY GENERAL

James R. Redpath
Assistant Attorney General
Transportation Section

JRR:djd